

Amendments to the Specification**Please amend the specification as follows:**

Please replace the paragraph beginning at page 7, line 13, with the following paragraph:

Figures 1A-C show a sequence comparison of *Thermus* DNA ligases.

Figure 1A illustrates the evolutionary tree for *Thermus* DNA ligases. Figure 1B is a regional sequence alignment of nine *Thermus* ligases: *Tsp.* AK16D (SEQ. ID. No. 22); *Thermus aquaticus* YT-1 (SEQ. ID. No. 15); *Thermus Thermophilus* ("Tth") (SEQ. ID. No. 23); *Thermus flavus* (SEQ. ID. No. 16); *Thermus filiformis* Tok4A2 (SEQ. ID. No. 17); *Thermus filiformis* Tok6A1 (SEQ. ID. No. 18); *Tsp.* SM32 (SEQ. ID. No. 19); *Tsp.* Vil3 (SEQ. ID. No. 20); *T. scot* (SEQ. ID. No. 21). The aa (i.e. amino acid) sequence of *T. scot* retrieved from GenBank by accession number 1085749 (SEQ. ID. No. 31), is as follows:

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Met Thr Leu Glu Glu Ala Arg Lys Arg Val Asn Glu Leu Arg Asp Leu
—1—————5—————10—————15
Ile Arg Tyr His Asn Tyr Arg Tyr Tyr Val Leu Ala Asp Pro Glu Ile
—20—————25—————30
Ser Asp Ala Glu Tyr Asp Arg Leu Leu Arg Glu Leu Lys Glu Leu Glu
—35—————40—————45
Glu Arg Phe Pro Glu Leu Lys Ser Pro Asp Ser Pro Thr Glu Gln Val
—50—————55—————60
Gly Ala Lys Pro Leu Glu Ala Thr Phe Arg Pro Ile Arg His Pro Thr
—65—————70—————75—————80
Arg Met Tyr Ser Leu Asp Asn Ala Phe Asn Phe Asp Glu Leu Lys Ala
—85—————90—————95
Phe Glu Glu Arg Ile Gly Arg Ala Leu Gly Arg Glu Gly Pro Phe Ala
—100—————105—————110
Tyr Thr Val Glu His Lys Val Asp Gly Leu Ser Val Asn Leu Tyr Tyr
—115—————120—————125
Glu Asp Gly Val Leu Val Trp Gly Ala Thr Arg Gly Asp Gly Glu Val
—130—————135—————140
Gly Glu Glu Val Thr Gln Asn Leu Leu Thr Ile Pro Thr Ile Pro Arg
145—————150—————155—————160
Arg Val Lys Gly Val Pro Glu Arg Leu Glu Val Arg Gly Glu Val Tyr
—165—————170—————175

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~~Met Pro Ile Glu Ala Phe Leu Arg Leu Asn Glu Glu Leu Glu Glu Lys~~
~~180 185 190~~

~~Gly Glu Lys Ile Phe Lys Asn Pro Arg Asn Ala Ala Ala Gly Ser Leu~~
~~195 200 205~~

~~Arg Gln Lys Asp Pro Arg Ile Thr Ala Arg Arg Gly Leu Arg Ala Thr~~
~~210 215 220~~

~~Phe Tyr Ala Leu Gly Leu Gly Leu Glu Glu Ser Gly Leu Lys Thr Gln~~
~~225 230 235 240~~

~~Leu Asp Leu Leu His Trp Leu Arg Glu Lys Gly Phe Pro Val Glu His~~
~~245 250 255~~

~~Gly Phe Ala Arg Ala Glu Gly Ala Glu Gly Val Glu Arg Ile Tyr Gln~~
~~260 265 270~~

~~Gly Trp Leu Lys Glu Arg Arg Ser Leu Pro Phe Glu Ala Asp Gly Val~~
~~275 280 285~~

~~Val Val Lys Leu Asp Glu Leu Ser Leu Trp Arg Glu Leu Gly Tyr Thr~~
~~290 295 300~~

~~Ala Arg Ala Pro Arg Phe Ala Ile Ala Tyr Lys Phe Pro Ala Glu Glu~~
~~305 310 315 320~~

~~Lys Glu Thr Arg Leu Leu Gln Val Val Phe Gln Val Gly Arg Thr Gly~~
~~325 330 335~~

~~Arg Val Thr Pro Val Gly Ile Leu Glu Pro Val Phe Ile Glu Gly Ser~~
~~340 345 350~~

~~Val Val Ser Arg Val Thr Leu His Asn Glu Ser Tyr Ile Glu Glu Leu~~
~~355 360 365~~

~~Asp Val Arg Ile Gly Asp Trp Val Leu Val His Lys Ala Gly Gly Val~~
~~370 375 380~~

~~Ile Pro Glu Val Leu Arg Val Leu Lys Glu Lys Arg Thr Gly Glu Glu~~
~~385 390 395 400~~

~~Arg Pro Ile Arg Trp Pro Glu Thr Cys Pro Glu Cys Gly His Arg Leu~~
~~405 410 415~~

~~Val Lys Glu Gly Lys Val His Arg Cys Pro Asn Pro Leu Cys Pro Ala~~
~~420 425 430~~

~~Lys Arg Phe Glu Ala Ile Arg His Tyr Ala Ser Arg Lys Ala Met Asp~~
~~435 440 445~~

~~Ile Gly Gly Leu Gly Glu Lys Leu Ile Glu Lys Leu Leu Glu Lys Gly~~
~~450 455 460~~

~~Leu Val Lys Asp Val Ala Asp Leu Tyr Arg Leu Lys Lys Glu Asp Leu~~
~~465 470 475 480~~

~~Leu Gly Leu Glu Arg Met Gly Glu Lys Ser Ala Gln Asn Leu Leu Arg~~
~~485 490 495~~

~~Gln Ile Glu Glu Ser Lys Gly Arg Gly Leu Glu Arg Leu Leu Tyr Ala~~
~~500 505 510~~

~~Leu Gly Leu Pro Gly Val Gly Glu Val Leu Ala Arg Asn Leu Ala Ala~~
~~515 520 525~~

~~His Phe Gly Thr Met Asp Arg Leu Leu Glu Ala Ser Leu Glu Glu Leu~~
~~530 535 540~~

~~Leu Gln Val Glu Glu Val Gly Glu Leu Thr Ala Arg Gly Ile Tyr Glu~~
~~545 550 555 560~~

~~Thr Leu Gln Asp Pro Ala Phe Arg Asp Leu Val Arg Arg Leu Lys Glu~~
~~565 570 575~~

~~Ala Gly Val Val Met Glu Ala Lys Glu Arg Gly Glu Glu Ala Leu Lys~~
~~580 585 590~~

~~Gly Leu Thr Phe Val Ile Thr Gly Glu Leu Ser Arg Pro Arg Glu Glu~~
~~595 600 605~~

~~Val Lys Ala Leu Leu Arg Arg Leu Gly Ala Lys Val Thr Asp Ser Val~~
~~610 615 620~~

~~Ser Arg Lys Thr Ser Tyr Leu Val Val Gly Glu Asn Pro Gly Ser Lys~~
~~625 630 635 640~~

~~Leu Glu Lys Ala Arg Ala Leu Gly Val Pro Thr Leu Thr Glu Glu Glu~~
~~645 650 655~~

~~Leu Tyr Arg Leu Ile Glu Glu Arg Thr Gly Lys Pro Val Glu Thr Leu~~
~~660 665 670~~

~~Ala Ser.~~

The adenylation motif KXDG (SEQ. ID. No. 24) is underlined and the adenylation site is marked by *. The numbering of aa is based on *Tsp.* AK16D ligase (SEQ. ID. No. 1). Figure 1C is a complete amino acid sequence of *Tsp.* AK16D ligase (SEQ. ID. No. 1). The adenylation motif KXDG (SEQ. ID. No. 24) is underlined and the adenylation site ¹¹⁸K is shown with a (*) above the residue. The complete sequence of *Tsp.* AK16D ligase gene and partial sequences of six other *Thermus* ligase genes have been deposited with GenBank under accession No. AF092862 for *Tsp.* AK16D (SEQ. ID. No. 1), AF092863 for *Thermus aquaticus* YT-1 (SEQ. ID. No. 25), as follows:-

~~Pro Glu Leu Lys Ser Pro Asp Ser Pro Thr Glu Gln Val Gly Ala Arg~~
~~1 5 10 15~~

~~Pro Leu Glu Ser Thr Phe Arg Pro Val Arg His Pro Thr Arg Met Tyr~~
~~20 25 30~~

~~Ser Leu Asp Asn Ala Phe Ser Leu Asp Glu Val Arg Ala Phe Glu Glu~~
~~35 40 45~~

~~Arg Ile Glu Arg Ala Leu Gly Arg Lys Gly Pro Phe Leu Tyr Thr Val~~
~~50 55 60~~

~~Glu His Lys Val Asp Gly Leu Ser Val Asn Leu Tyr Tyr Glu Glu Gly~~
~~65 70 75 80~~

~~Ile Leu Val Phe Gly Ala Thr Arg Gly Asp Gly Glu Thr Gly Glu Glu~~
~~85 90 95~~

~~Val Thr Gln Asn Leu Leu Thr Ile Arg Thr Ile Pro Arg Arg Leu Thr~~
~~100 105 110~~

~~Gly Val Pro Asp Arg Leu Glu Val Arg Gly Glu Val Tyr Met Pro Ile~~
~~115 120 125~~

~~Glu Ala Phe Leu Arg Leu Asn Gln Glu Leu Glu Glu Ala Gly Glu Arg~~
~~130 135 140~~

~~Ile Phe Lys Asn Pro Arg Asn Ala Ala Ala Gly Ser Leu Arg Gln Lys~~
~~145 150 155 160~~

~~Asp Pro Arg Val Thr Ala Arg Arg Gly Leu Arg Ala Thr Phe Tyr Ala~~
~~165 170 175~~

~~Leu Gly Leu Gly Leu Glu Glu Thr Gly Leu Lys Ser Gln His Asp Leu~~
~~180 185 190~~

~~Leu Leu Trp Leu Lys Glu Arg Gly Phe Pro Val Glu His Gly Phe Thr~~
~~195 200 205~~

~~Arg Ala Leu Gly Ala Glu Gly Val Glu Glu Val Tyr Gln Ala Trp Leu~~
~~210 215 220~~

~~Lys Glu Arg Arg Lys Leu Pro Phe Glu Ala Asp Gly Val Val Val Lys~~
~~225 230 235 240~~

~~Leu Asp Asp Leu Ala Leu Trp Arg Glu Leu Gly Tyr Thr Ala Arg Ala~~
~~245 250 255~~

~~Pro Arg Phe Ala Leu Ala Tyr Lys Phe Pro Ala Glu Glu Lys Glu Thr~~
~~260 265 270~~

~~Arg Leu Leu Ser Val Ala Phe Gln Val Gly Arg Thr Gly Arg Ile Thr~~
~~275 280 285~~

~~Pro Val Gly Val Leu Glu Pro Val Phe Ile Glu Gly Ser Glu Val Ser~~
~~290 295 300~~

~~Arg Val Thr Leu His Asn Glu Ser Phe Ile Glu Glu Leu Asp Val Arg~~
~~305 310 315 320~~

~~Ile Gly Asp Trp Val Leu Val His Lys Ala Gly Gly Val Ile Pro Glu~~
~~325 330 335~~

~~Val Leu Arg Val Leu Lys Glu Arg Arg Thr Gly Glu Glu Lys Pro Ile~~
~~340 345 350~~

~~Leu Trp Pro Glu Asn Cys Pro Glu Cys Gly His Ala Leu Leu Lys Glu~~
~~355 360 365~~

~~Gly Lys Val His Arg Cys Pro Asn Pro Leu Cys Pro Ala Lys Arg Phe~~
~~370 375 380~~

~~Glu Ala Ile Arg His Tyr Ala Ser Arg Lys Ala Met Asp Ile Gln Gly~~
~~385 390 395 400~~

~~Leu Gly Glu Lys Leu Ile Glu Lys Leu Leu Glu Lys Gly Leu Val Arg~~
~~405 410 415~~

~~Asp Val Ala Asp Leu Tyr Arg Leu Arg Lys Glu Asp Leu Leu Asp Leu~~
~~420 425 430~~

~~Glu Arg Met Gly Glu Lys Ser Ala Glu Asn Leu Leu Arg Gln Ile Glu~~
~~435 440 445~~

~~Glu Ser Lys Gly Arg Gly Leu Glu Arg Leu Leu Tyr Ala Leu Gly Leu~~
~~450 455 460~~

~~Pro Gly Val Gly Glu Val Leu Ala Arg Asn Leu Ala Leu Arg Phe Gly~~
~~465 470 475 480~~

~~His Met Asp Arg Leu Leu Glu Ala Gly Leu Gly Asp Leu Leu Glu Val~~
~~485 490 495~~

~~Glu Gly Val Gly Glu Leu Thr Ala Arg Ala Ile Leu Asn Thr Leu Lys~~
~~500 505 510~~

~~Asp Pro Glu Phe Arg Asp Leu Val Arg Arg Leu Lys Glu Ala Gly~~
~~515 520 525~~;

AF092864 for *Thermus flavus* (SEQ. ID. No. 26), as follows:

~~Arg Phe Pro Glu Leu Lys Ser Pro Asp Ser Pro Thr Glu Gln Val Gly~~
~~1 5 10 15~~

~~Ala Arg Pro Leu Glu Ala Thr Phe Arg Pro Val Arg His Pro Thr Arg~~
~~20 25 30~~

~~Met Tyr Ser Leu Asp Asn Ala Phe Asn Phe Asp Glu Leu Lys Ala Phe~~
~~35 40 45~~

~~Glu Glu Arg Ile Glu Arg Ala Leu Gly Arg Glu Gly Pro Phe Ala Tyr~~
~~50 55 60~~

~~Thr Val Glu His Lys Val Asp Gly Leu Ser Val Asn Leu Tyr Tyr Glu~~
~~65 70 75 80~~

~~Asp Gly Val Leu Val Tyr Gly Ala Thr Arg Gly Asp Gly Glu Val Gly~~
~~85 90 95~~

~~Glu Glu Val Thr Gln Asn Leu Leu Thr Ile Pro Thr Ile Pro Arg Arg~~
~~100 105 110~~

~~Leu Lys Gly Val Pro Glu Arg Leu Glu Val Arg Gly Glu Val Tyr Met~~
~~115 120 125~~

~~Pro Val Glu Ala Phe Leu Arg Leu Asn Glu Glu Leu Glu Glu Arg Gly~~
~~130 135 140~~

~~Ala Arg Ile Phe Lys Asn Pro Arg Asn Ala Ala Ala Gly Ser Leu Arg~~
~~145 150 155 160~~

~~Gln Lys Asp Pro Arg Ile Thr Ala Lys Arg Gly Leu Arg Ala Thr Phe~~
~~165 170 175~~

~~Tyr Ala Leu Gly Leu Gly Leu Glu Glu Val Glu Arg Glu Gly Val Ala~~
~~180 185 190~~

~~Thr Gln Phe Ala Leu Leu His Trp Leu Lys Glu Lys Ser Phe Pro Val~~
~~195 200 205~~

~~Glu His Gly Tyr Ala Arg Ala Val Gly Ala Glu Gly Val Glu Ala Val~~
~~210 215 220~~

~~Tyr Gln Asp Trp Leu Lys Lys Arg Arg Ala Leu Pro Phe Glu Ala Asp~~
~~225 230 235 240~~

~~Gly Val Val Val Lys Leu Asp Glu Leu Ala Leu Trp Arg Glu Leu Gly~~
~~245 250 255~~

~~Tyr Thr Ala Arg Ala Pro Arg Phe Ala Ile Ala Tyr Lys Phe Pro Ala~~
~~260 265 270~~

~~Glu Glu Lys Glu Thr Arg Leu Leu Asp Val Ala Phe Gln Val Gly Arg~~
~~275 280 285~~

~~Thr Gly Arg Val Thr Pro Val Gly Ile Leu Glu Pro Val Phe Leu Glu~~
~~290 295 300~~

~~Gly Ser Glu Val Ser Arg Val Thr Leu His Asn Glu Ser Tyr Ile Glu~~
~~305 310 315 320~~

~~Glu Leu Asp Ile Arg Ile Gly Asp Trp Val Leu Val His Lys Ala Gly~~
~~325 330 335~~

~~Gly Val Ile Pro Glu Val Leu Arg Val Leu Lys Glu Arg Arg Thr Gly~~
~~340 345 350~~

~~Glu Glu Arg Pro Ile Arg Trp Pro Glu Thr Cys Pro Glu Cys Gly His~~
~~355 360 365~~

~~Arg Leu Leu Lys Glu Gly Lys Val His Arg Cys Pro Asn Pro Leu Cys~~
~~370 375 380~~

~~Pro Ala Lys Arg Phe Glu Ala Ile Arg His Phe Pro Ser Arg Lys Ala~~
~~385 390 395 400~~

~~Met Asp Ile Gln Gly Leu Gly Glu Lys Leu Ile Glu Arg Leu Leu Glu~~
~~405 410 415~~

~~Lys Gly Leu Val Lys Asp Val Ala Asp Leu Tyr Arg Leu Arg Lys Glu~~
~~420 425 430~~

~~Asp Leu Val Gly Leu Glu Arg Met Gly Glu Lys Ser Ala Gln Asn Leu~~
~~435 440 445~~

~~Leu Arg Gln Ile Glu Glu Ser Lys Arg Arg Gly Leu Glu Arg Leu Leu~~
~~450 455 460~~

~~Tyr Ala Leu Gly Leu Pro Gly Val Gly Glu Val Leu Ala Arg Asn Leu~~
~~465 470 475 480~~

~~Ala Ala Arg Phe Gly Asn Met Asp Arg Leu Leu Glu Ala Ser Leu Glu~~
~~485 490 495~~

~~Glu Leu Leu Glu Val Glu Glu Val Gly Glu Leu Thr Ala Arg Ala Ile~~
~~500 505 510~~

~~Leu Glu Thr Leu Lys Asp Pro Ala Phe Arg Asp Leu Val Arg Arg Leu~~
~~515 520 525~~

~~Lys Glu Ala Gly Val Glu Met Glu Ala Lys Glu Lys Gly Gly Glu Ala~~
~~530 535 540~~

~~Leu Lys Gly Leu Thr Phe Val Ile Thr Gly Glu Leu Ser~~
~~545 550 555~~;

AF092865 for *Thermus filiformis* Tok4A2 (SEQ. ID. No. 27), as follows:-

~~Asp Ser Pro Thr Glu Gln Val Gly Ala Arg Pro Leu Glu Pro Thr Phe~~
~~1 5 10 15~~

~~Arg Pro Val Arg His Pro Thr Arg Met Tyr Ser Leu Asp Asn Ala Phe~~
~~20 25 30~~

~~Thr Tyr Glu Glu Val Leu Ala Phe Glu Glu Arg Leu Asp Arg Ala Leu~~
~~35 40 45~~

~~Gly Arg Lys Arg Pro Phe Leu Tyr Thr Val Glu His Lys Val Asp Gly~~
~~50 55 60~~

~~Leu Ser Val Asn Leu Tyr Tyr Glu Glu Gly Val Leu Val Phe Gly Ala~~
~~65 70 75 80~~

~~Thr Arg Gly Asp Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa~~
~~85 90 95~~

~~Thr Ile Pro Thr Ile Pro Arg Arg Leu Lys Gly Val Pro Asp Arg Leu~~
~~100 105 110~~

~~Glu Val Arg Gly Glu Val Tyr Met Pro Ile Glu Ala Phe Leu Arg Leu~~
~~115 120 125~~

~~Asn Glu Glu Leu Glu Glu Arg Gly Glu Lys Val Phe Lys Asn Pro Arg~~
~~130 135 140~~

~~Asn Ala Ala Ala Gly Ser Leu Arg Gln Lys Asp Pro Arg Val Thr Ala~~
~~145 150 155 160~~

~~Lys Arg Gly Leu Arg Ala Thr Phe Tyr Ala Leu Gly Leu Gly Leu Glu~~
~~165 170 175~~

~~Glu Ser Gly Leu Lys Ser Gln Tyr Glu Leu Leu Leu Trp Leu Lys Glu~~
~~180 185 190~~

~~Lys Gly Phe Pro Val Glu His Gly Tyr Glu Lys Ala Leu Gly Ala Glu~~
~~195 200 205~~

~~Gly Val Glu Glu Val Tyr Gln Ala Xaa Xaa Xaa Lys Arg His Ala Leu~~
~~210 215 220~~

~~Pro Phe Glu Ala Asp Gly Val Val Val Lys Met Asp Asp Leu Thr Leu~~
~~225 230 235 240~~

~~Trp Gly Glu Leu Gly Tyr Thr Ala Arg Ala Pro Arg Phe Ala Ile Ala~~
~~245 250 255~~

~~Tyr Lys Phe Pro Ala Glu Glu Asn Glu Thr Arg Leu Leu Asp Val Asp~~
~~260 265 270~~

~~Phe Gln Val Gly Arg Thr Gly Arg Val Thr Pro Val Gly Ile Leu Glu~~
~~275 280 285~~

~~Pro Val Phe Leu Glu Gly Ser Glu Val Ser Arg Val Thr Leu His Asn~~
~~290 295 300~~

~~Glu Ser Tyr Ile Glu Glu Leu Asp Ile Arg Ile Gly Asp Trp Val Leu~~
~~305 310 315 320~~

~~Val His Lys Ala Gly Gly Val Ile Pro Glu Val Leu Arg Val Leu Lys~~
~~325 330 335~~
~~Glu Arg Arg Thr Gly Glu Glu Arg Pro Ile Arg Trp Pro Glu Thr Cys~~
~~340 345 350~~
~~Pro Glu Cys Gly His Arg Leu Leu Lys Glu Gly Lys Val His Arg Cys~~
~~355 360 365~~
~~Pro Asn Pro Leu Cys Pro Ala Lys Arg Phe Glu Ala Ile Arg His Phe~~
~~370 375 380~~
~~Pro Ser Arg Lys Ala Met Asp Ile Gln Gly Leu Gly Glu Lys Leu Ile~~
~~385 390 395 400~~
~~Glu Arg Leu Leu Glu Lys Gly Leu Val Lys Asp Val Ala Asp Leu Tyr~~
~~405 410 415~~
~~Arg Leu Arg Lys Glu Asp Leu Val Gly Leu Glu Arg Met Gly Glu Lys~~
~~420 425 430~~
~~Ser Ala Gln Asn Leu Leu Arg Gln Ile Glu Glu Ser Lys Arg Arg Gly~~
~~435 440 445~~
~~Leu Glu Arg Leu Leu Tyr Ala Leu Gly Leu Pro Gly Val Gly Glu Val~~
~~450 455 460~~
~~Leu Ala Arg Asn Leu Ala Ala Arg Phe Gly Asn Met Asp Arg Leu Leu~~
~~465 470 475 480~~
~~Glu Ala Ser Leu Glu Glu Leu Leu Glu Val Glu Glu Val Gly Glu Leu~~
~~485 490 495~~
~~Thr Ala Arg Ala Ile Leu Glu Thr Leu Lys Asp Pro Ala Phe Arg Asp~~
~~500 505 510~~
~~Leu Val Arg Arg Leu Lys Glu Ala Gly Val Glu Met Glu Ala Lys Glu~~
~~515 520 525~~
~~Lys Gly Gly Glu Ala Leu Lys Gly Leu Thr Phe Val Ile Thr Gly Glu~~
~~530 535 540~~
~~Leu Ser~~
~~545~~;

AF092866 for *Thermus filiformis* Tok6A1 (SEQ. ID. No. 28), as follows:

~~Arg Phe Pro Glu Phe Lys Ser Pro Asp Ser Pro Thr Glu Gln Val Gly~~
~~1 5 10 15~~
~~Ala Arg Pro Leu Glu Pro Thr Phe Arg Pro Val Arg His Pro Thr Arg~~
~~20 25 30~~

~~Met Tyr Ser Leu Asp Asn Ala Phe Thr Tyr Glu Glu Val Leu Ala Phe~~
~~35 40 45~~

~~Glu Glu Arg Leu Glu Arg Ala Leu Gly Arg Lys Arg Pro Phe Leu Tyr~~
~~50 55 60~~

~~Thr Val Glu His Lys Val Asp Gly Leu Ser Val Asn Leu Tyr Tyr Glu~~
~~65 70 75 80~~

~~Glu Gly Val Leu Val Phe Gly Ala Thr Arg Gly Asp Gly Glu Val Gly~~
~~85 90 95~~

~~Glu Glu Val Thr Gln Asn Leu Leu Thr Ile Pro Thr Ile Pro Arg Arg~~
~~100 105 110~~

~~Leu Lys Gly Val Pro Asp Arg Leu Glu Val Arg Gly Glu Val Tyr Met~~
~~115 120 125~~

~~Pro Ile Glu Ala Phe Leu Arg Leu Asn Glu Glu Leu Glu Glu Arg Gly~~
~~130 135 140~~

~~Glu Lys Val Phe Lys Asn Pro Arg Asn Ala Ala Ala Gly Ser Leu Arg~~
~~145 150 155 160~~

~~Gln Lys Asp Pro Arg Val Thr Ala Lys Arg Gly Leu Arg Ala Thr Phe~~
~~165 170 175~~

~~Tyr Ala Leu Gly Leu Gly Leu Glu Glu Ser Gly Leu Lys Ser Gln Tyr~~
~~180 185 190~~

~~Glu Leu Leu Leu Trp Leu Lys Glu Lys Gly Phe Pro Val Glu His Gly~~
~~195 200 205~~

~~Tyr Glu Lys Ala Leu Gly Ala Glu Gly Val Glu Glu Val Tyr Arg Arg~~
~~210 215 220~~

~~Phe Leu Ala Gln Arg His Ala Leu Pro Phe Glu Ala Asp Gly Val Val~~
~~225 230 235 240~~

~~Val Lys Leu Asp Asp Leu Ala Leu Trp Arg Glu Leu Gly Tyr Thr Ala~~
~~245 250 255~~

~~Arg Ala Pro Arg Phe Ala Leu Ala Tyr Lys Phe Pro Ala Glu Glu Lys~~
~~260 265 270~~

~~Glu Thr Arg Leu Leu Asp Val Val Phe Gln Val Gly Arg Thr Gly Arg~~
~~275 280 285~~

~~Val Thr Pro Val Gly Val Leu Glu Pro Val Phe Ile Glu Gly Ser Glu~~
~~290 295 300~~

~~Val Ser Arg Val Thr Leu His Asn Glu Ser Tyr Ile Glu Glu Leu Asp~~
~~305 310 315 320~~

~~Ile Arg Ile Gly Asp Trp Val Leu Val His Lys Ala Gly Gly Val Ile~~
~~325 330 335~~
~~Pro Glu Val Leu Arg Val Leu Lys Glu Arg Arg Thr Gly Glu Glu Arg~~
~~340 345 350~~
~~Pro Ile Arg Trp Pro Glu Thr Cys Pro Glu Cys Gly His Arg Leu Val~~
~~355 360 365~~
~~Lys Glu Gly Lys Val His Arg Cys Pro Asn Pro Leu Cys Pro Ala Lys~~
~~370 375 380~~
~~Arg Phe Glu Ala Ile Arg His Tyr Ala Ser Arg Lys Ala Met Asp Ile~~
~~385 390 395 400~~
~~Glu Gly Leu Gly Glu Lys Leu Ile Glu Arg Leu Leu Glu Lys Gly Leu~~
~~405 410 415~~
~~Val Arg Asp Val Ala Asp Leu Tyr His Leu Arg Lys Glu Asp Leu Leu~~
~~420 425 430~~
~~Gly Leu Glu Arg Met Gly Glu Lys Ser Ala Gln Asn Leu Leu Arg Gln~~
~~435 440 445~~
~~Ile Glu Glu Ser Lys His Arg Gly Leu Glu Arg Leu Leu Tyr Ala Leu~~
~~450 455 460~~
~~Gly Leu Pro Gly Val Gly Glu Val Leu Ala Arg Asn Leu Ala Arg Arg~~
~~465 470 475 480~~
~~Phe Gly Thr Met Asp Arg Leu Leu Glu Ala Ser Leu Glu Glu Leu Leu~~
~~485 490 495~~
~~Glu Val Glu Glu Val Gly Glu Leu Thr Ala Arg Ala Ile Leu Glu Thr~~
~~500 505 510~~
~~Leu Lys Asp Pro Ala Phe Arg Asp Leu Val Arg Arg Leu Lys Glu Ala~~
~~515 520 525~~
~~Gly Val Ser Met Glu Ser Lys Glu Glu~~
~~530 535~~;

AF092867 for *Tsp. Vil3* (SEQ. ID. No. 29), as follows:

~~Pro Ser Pro Asp Ser Pro Thr Glu Gln Val Gly Ala Lys Pro Leu Glu~~
~~1 5 10 15~~
~~Ala Thr Phe Arg Pro Ile Arg His Pro Thr Arg Met Tyr Ser Leu Asp~~
~~20 25 30~~
~~Asn Ala Phe Thr Leu Glu Glu Val Arg Thr Phe Glu Glu Arg Ile Glu~~
~~35 40 45~~

~~Arg Ala Leu Gly Arg Lys Gly Pro Phe Val Tyr Thr Val Glu His Lys~~
~~50 55 60~~

~~Val Asp Gly Leu Ser Val Asn Leu Tyr Tyr Glu Glu Gly Ile Leu Val~~
~~65 70 75 80~~

~~Trp Gly Ala Thr Arg Gly Asp Gly Glu Thr Gly Glu Glu Val Thr Gln~~
~~85 90 95~~

~~Asn Leu Leu Thr Ile Pro Thr Ile Pro Arg Arg Leu Lys Gly Val Pro~~
~~100 105 110~~

~~Glu Arg Leu Glu Val Arg Gly Glu Val Tyr Met Pro Ile Glu Ala Phe~~
~~115 120 125~~

~~Leu Arg Leu Asn Glu Glu Leu Glu Glu Lys Gly Glu Lys Ile Phe Lys~~
~~130 135 140~~

~~Asn Pro Arg Asn Ala Ala Ala Gly Ser Phe Arg Gln Lys Asp Pro Arg~~
~~145 150 155 160~~

~~Ile Thr Ala Arg Arg Gly Leu Arg Ala Thr Phe Tyr Ala Leu Gly Leu~~
~~165 170 175~~

~~Gly Leu Glu Glu Ser Gly Leu Lys Thr Gln Leu Asp Leu Leu His Trp~~
~~180 185 190~~

~~Leu Arg Glu Lys Gly Phe Pro Val Glu His Gly Phe Ala Arg Ala Glu~~
~~195 200 205~~

~~Gly Ala Glu Gly Val Glu Arg Ile Tyr Gln Gly Trp Leu Lys Glu Arg~~
~~210 215 220~~

~~Arg Ser Leu Pro Phe Glu Ala Asp Gly Val Val Val Lys Leu Asp Glu~~
~~225 230 235 240~~

~~Leu Ser Leu Trp Arg Glu Leu Gly Tyr Thr Ala Arg Ala Pro Arg Phe~~
~~245 250 255~~

~~Ala Ile Ala Tyr Lys Phe Pro Ala Glu Glu Lys Glu Thr Ala Leu Phe~~
~~260 265 270~~

~~Gln Val Val Leu Gln Val Gly Arg Thr Gly Gln Val Thr Pro Val Gly~~
~~275 280 285~~

~~Ile Leu Glu Pro Val Phe Ile Glu Gly Ser Glu Val Ser Arg Val Thr~~
~~290 295 300~~

~~Leu His Asn Glu Ser Tyr Ile Glu Asp Leu Asp Val Arg Ile Gly Glu~~
~~305 310 315 320~~

~~Trp Val Leu Val His Asn Ala Gly Gly Val Ile Pro Glu Val Leu Arg~~
~~325 330 335~~

~~Val Leu Lys Glu Lys Arg Thr Gly Glu Glu Arg Pro Ile Arg Trp Pro~~
~~340 345 350~~

~~Glu Thr Cys Pro Glu Cys Gly His Arg Leu Val Lys Glu Gly Lys Val~~
~~355 360 365~~

~~His Arg Cys Pro Asn Pro Leu Cys Pro Ala Lys Arg Phe Glu Ala Ile~~
~~370 375 380~~

~~Arg His Tyr Ala Ser Arg Lys Ala Met Asp Ile Gly Gly Leu Gly Glu~~
~~385 390 395 400~~

~~Lys Leu Ile Glu Lys Leu Leu Glu Lys Gly Leu Val Lys Asp Val Ala~~
~~405 410 415~~

~~Asp Leu Tyr Arg Leu Lys Glu Glu Asp Leu Val Gly Leu Glu Arg Met~~
~~420 425 430~~

~~Gly Lys Lys Ser Ala Gln Asn Leu Leu Arg Gln Ile Glu Lys Ser Lys~~
~~435 440 445~~

~~Ala Arg Gly Leu Glu Arg Leu Leu Tyr Ala Leu Gly Leu Pro Gly Val~~
~~450 455 460~~

~~Gly Glu Val Leu Ala Arg Asn Leu Ala Ala His Phe Gly Thr Met Asp~~
~~465 470 475 480~~

~~Arg Leu Leu Glu Ala Ser Leu Glu Glu Leu Leu Gln Val Glu Glu Val~~
~~485 490 495~~

~~Gly Glu Leu Thr Ala Arg Gly Ile Tyr~~
~~500 505;~~

and AF092868 for *Tsp*. SM32 (SEQ. ID. No. 30), as follows:

~~Asp Asn Ala Phe Thr His His Asp Leu Lys Ala Phe Glu Asp Arg Val~~
~~1 5 10 15~~

~~Asp Arg Ala Leu Gly Arg Glu Gly Pro Phe Val Tyr Thr Val Glu His~~
~~20 25 30~~

~~Lys Val Asp Gly Leu Ser Val Asn Leu Tyr Tyr Glu Glu Gly Ile Leu~~
~~35 40 45~~

~~Val Phe Gly Ala Pro Arg Gly Asp Gly Glu Val Gly Glu Glu Val Thr~~
~~50 55 60~~

~~Gln Asn Leu Leu Thr Ile Pro Thr Ile Pro Arg Arg Leu Lys Gly Val~~
~~65 70 75 80~~

~~Pro Glu Arg Leu Glu Val Arg Gly Glu Val Tyr Met Pro Ile Glu Ala~~
~~85 90 95~~

~~Phe Leu Arg Leu Asn Glu Glu Leu Glu Glu Ala Gly Glu Lys Val Phe~~
~~100 105 110~~

~~Lys Asn Pro Arg Asn Ala Ala Ala Gly Ser Leu Arg Gln Lys Asp Pro~~
~~115 120 125~~

~~Arg Ile Thr Ala Lys Arg Gly Leu Arg Ala Thr Phe Tyr Ala Leu Gly~~
~~130 135 140~~

~~Leu Gly Leu Glu Glu Ser Gly Leu Lys Thr Gln Tyr Glu Phe Leu Leu~~
~~145 150 155 160~~

~~Trp Phe Lys Glu Lys Gly Phe Pro Val Glu His Gly Phe Ala Arg Ala~~
~~165 170 175~~

~~Thr Gly Ala Glu Gly Val Glu Arg Val Tyr Gln Gly Trp Leu Gln Lys~~
~~180 185 190~~

~~Arg Arg Lys Leu Pro Phe Glu Ala Asp Gly Val Val Val Lys Leu Asp~~
~~195 200 205~~

~~Glu Leu Ala Leu Trp Arg Glu Leu Gly Tyr Thr Ala Arg Ala Pro Arg~~
~~210 215 220~~

~~Phe Ala Ile Ala Tyr Lys Phe Pro Ala Glu Glu Lys Glu Thr Arg Leu~~
~~225 230 235 240~~

~~Leu Asp Val Val Phe Gln Val Gly Arg Thr Gly Arg Val Thr Pro Val~~
~~245 250 255~~

~~Gly Ile Leu Glu Pro Val Leu Ile Glu Gly Ser Glu Val Ser Arg Val~~
~~260 265 270~~

~~Thr Leu His Asn Glu Ser Tyr Ile Glu Glu Leu Asp Ile Arg Ile Gly~~
~~275 280 285~~

~~Asp Trp Val Leu Val His Lys Ala Gly Gly Val Ile Pro Glu Val Leu~~
~~290 295 300~~

~~Arg Val Leu Lys Glu Arg Arg Thr Gly Ala Glu Arg Pro Ile Val Trp~~
~~305 310 315 320~~

~~Pro Glu Asn Cys Pro Glu Cys Gly His His Leu Val Lys Glu Gly Lys~~
~~325 330 335~~

~~Val His Arg Cys Pro Asn Pro Leu Cys Pro Ala Lys Arg Phe Glu Ala~~
~~340 345 350~~

~~Ile Arg His Tyr Ala Ser Arg Lys Ala Met Asp Ile Gln Gly Leu Gly~~
~~355 360 365~~

~~Glu Lys Leu Ile Glu Lys Leu Leu Glu Asn Gly Leu Val Lys Asp Val~~
~~370 375 380~~

~~Ala Asp Leu Tyr Arg Leu Arg Lys Glu Asp Leu Val Gly Leu Glu Arg~~
~~385 390 395 400~~

~~Met Gly Glu Lys Ser Ala Glu Asn Leu Leu Arg Gln Ile Glu Glu Ser~~
~~405 410 415~~

~~Lys His Arg Gly Leu Glu Arg Leu Leu Tyr Ala Leu Gly Leu Pro Gly~~
~~420 425 430~~

~~Val Gly Glu Val Leu Ala Arg Asn Leu Ala Ala Arg Phe Gly Thr Met~~
~~435 440 445~~

~~Asp Arg Leu Leu Glu Ala Thr Leu Glu Glu Leu Leu Glu Val Glu Glu~~
~~450 455 460~~

~~Val Gly Glu Leu Thr Ala Arg Gly Ile Trp Glu Thr Leu Gln Asp Pro~~
~~465 470 475 480~~

Ala.